Supplement to Oil-Spill Risk Analysis: Beaufort Sea Planning Area, OCS Lease Sale 202

Supplement to the Oil-Spill Risk Analysis: Beaufort Sea Planning Area, OCS Lease Sale 202

By:

Walter R. Johnson
Charles F. Marshall
Eileen M. Lear (Editor)

Contents

List of Tables

Introduction

The Federal Government plans to offer U.S. Outer Continental Shelf (OCS) lands in the Beaufort Sea Planning Area for oil and gas leasing. Because oil spills may occur from activities associated with offshore oil exploration, production, and transportation resulting from these lease sales, the Minerals Management Service (MMS) conducts a formal oil-spill risk analysis (OSRA) to support the environmental impact statement (EIS) and environmental assessments (EA's) completed prior to conducting the proposed leasing of this area. An analysis for Beaufort Sea OCS Lease Sale 202 was previously conducted in 2002 to estimate the risk of oil-spill contact to sensitive offshore and onshore environmental resources and socioeconomic features from oil spills accidentally occurring from OCS activities (Johnson et al., 2002). Because of new information regarding the fault-tree method of estimating oil-spill frequencies relevant to the Arctic (Bercha Group, 2006), MMS analysts have new estimates for the number of spills occurring and contacting environmental resources over the assumed life of the lease area (combined probabilities). These new estimates are presented in this supplement as tables to replace the combined probability tables contained in the original 2002 OSRA report. For ease of comparison, the authors have retained the original table numbers but added an "R" to identify them as replacement tables; only tables that have changed are presented.

Summary of the Proposed Action and Alternatives

The proposed action is to lease OCS lands in the Beaufort Sea Planning Area. As shown in figure 1 of the 2002 OSRA report (Johnson et al., 2002), the study area for this analysis, which extends from latitudes 68.0° N. to 74.0° N. and from longitudes 134.0° W. to 176.0° W., defines the geographic boundaries that encompass the environmental resource areas at risk from a hypothetical oil spill from OCS operations in the lease areas.

The full sale area and four alternatives to the proposed action that were judged to be "economic" were analyzed in the 2002 OSRA. The four alternatives analyzed are the Barrow Subsistence Whale Deferral, Nuiqsut Subsistence Whale Deferral, Kaktovik Subsistence Whale Deferral, Eastern Bowhead Deferral. These alternatives were analyzed by using the conditional and combined probabilities (representing oil-spill occurrence and contact) relevant to only those portions of the hypothetical launch areas that overlay the respective areas—the remaining nondeferred areas.

The proposed action would defer leasing within areas in which Barrow and Kaktovik residents conduct subsistence whaling. The MMS received several comments in response to the Request for Information that was published in the *Federal Register* on October 28, 2005. Some of the comments expressed interest in leases within the whole Area of Call. That area (USDOI/MMS, 2006, Figure 1) includes 1,877 whole or partial blocks that encompass 9,770,000 acres (about.3,954,000 hectares). The MMS also received letters about the potential effects of operations in subsistence-whaling areas (USDOI/MMS, 2006, Appendix A). The subareas that would not be offered for lease by the proposed action consist of 54 whole or partial blocks, equaling approximately 259,000 acres, or 3 percent of the whole Area of Call. The deferrals were conceived as a way to reduce conflicts

between subsistence whalers and OCS operations. The deferral areas were discussed during public hearings on the Alaska North Slope and were the subject of comment letters on the multiple-sale Final EIS and Sale 195 Environmental Assessment. The deferrals were addressed recently in a letter about Sale 202 from the Alaska Eskimo Whaling Commission (AEWC) and about the 5-year program from U.S. Senator Murkowski. As explained in the AEWC letter (USDOI/MMS, 2006, Appendix A), the Barrow and Kaktovik whalers hunt within areas larger than the deferrals. The MMS believes that conflicts between subsistence whalers and OCS operations within that larger area (and within the subsistence-whaling areas for Nuiqsut) can be moderated through mitigation measures.

Oil-Spill Risk Analysis

The OSRA was conducted in three parts corresponding to different aspects of the overall problem: (1) the probability of large oil-spill occurrence, (2) the trajectories of large oil spills from hypothetical spill locations to various environmental resource areas, and (3) a combination of the first two to estimate the overall oil-spill risk of combined occurrence and contact if there is oil development.

Probability of Large Oil Spills Occurring

The MMS defines large oil spills as greater than or equal to 1,000 barrels (bbl). The probability of one or more large oil spills occurring assumes that spills are random events that occur independently of each other as a Poisson process. In this analysis, the probability of large oil spills occurring is based on oil-spill frequencies per barrel produced that are derived from a fault-tree method of estimating spill occurrence relevant to the Arctic (Bercha Group, 2006). The fault-tree method incorporated an analysis of worldwide and U.S. Outer Continental Shelf oil-spill statistics to evaluate applicability to lease sales in the Beaufort and Chukchi Seas. Annual frequencies of spills, by spill size per billion barrels (Bbbl) produced, were developed for the Beaufort Sea Lease Sale 202 for the years 2019-2038. The resulting annual spill frequencies were weighted by annual production estimates to develop spill occurrence rates for platforms and wells (0.33 spills/Bbbl) and pipelines (0.20 spills/Bbbl); these rates were used in the OSRA Model. Only rates for spills of 1,000 bbl or greater were included in the analysis.

Spill rates are expressed as number of spills/Bbbl, defined as 10^9 bbl, of oil produced or transported. Only spills greater than or equal to 1,000 bbl are addressed because smaller spills may not persist long enough to be simulated by trajectory modeling. Another consideration is that a large spill is likely to be identified and reported; therefore, these records are more comprehensive than those of smaller spills. (Smaller spills are addressed in the EIS for each proposed action without the use of trajectory modeling.)

Two basic criteria were used in selecting volume of oil handled as the exposure variable: (1) the exposure variable should be simple to define, and (2) it should be a quantity that can be estimated. The volume of oil produced or transported was the chosen exposure variable primarily for the following reasons: (1) historic volumes of oil produced and transported are well documented; (2) using these volumes makes the calculation of the

estimated oil-spill occurrence rate simple—the ratio of the number of historic spills to the volume of oil produced or transported; and (3) future volumes of oil production and transportation are routinely estimated. Estimates of volume to be developed for a proposed action, which were prepared by analysts in the MMS Resource Evaluation and Assessment Section, Alaska OCS Region, are derived from the assessment of oil resources by using comprehensive geological and geophysical databases and related models. In addition, the MMS analysts estimate other exposure variables, such as the number of platforms and size of pipelines, as a function of the volume of oil produced or transported.

Fault Tree Analysis: During development of the final EIS for the Liberty Development and Production Plan (Beaufort Sea) in 2000, stakeholders expressed concern regarding the application of historical oil-spill data from the Gulf of Mexico (GOM) to the Beaufort OCS. Therefore, MMS used historical oil-spill data gathered from a multitude of sources. Because of this concern, the MMS sponsored a study regarding spill rates (Bercha Group, 2002 and 2006). These studies examined alternative oil-spill occurrence estimators for the Beaufort and Chukchi Seas using a fault tree method. Various causes of spills were looked at in relation to their relevance to Arctic conditions. An assessment was made regarding the contribution of Arctic versus non-Arctic conditions. Because sufficient historical data on large offshore oil spills for these regions do not exist, a model based on fault tree methodology was developed and applied for this Beaufort multiple sale (Bercha Group, 2002 and 2006). Using fault trees, oil-spill data from the GOM were modified and incremented to represent expected Arctic performance.

<u>**Large Oil Spill Rates Based on Fault Tree Analysis**</u>
<u>**(Bercha Group, 2006)**</u>

Spill Source	No. of Spills ≥ 1,000 bbl
Beaufort Sea OCS Platforms and Wells	0.33 spills/Bbbl
Beaufort Sea OCS Pipelines	0.20 spills/Bbbl

Poisson Distribution: The probability of oil spills occurring assumes that spills occur independently of each other as a Poisson process. The Poisson process is a statistical distribution commonly used to model random events. Using Bayesian techniques, Devanney and Stewart (1974) showed that the probability of n oil-spill contacts can be described by a negative binomial distribution. Smith et al. (1982), however, noted that when actual exposure is much less than historical exposure, as is the case here, the negative binomial distribution can be approximated by a Poisson distribution. The Poisson distribution has a significant advantage in calculations because it is defined by only one parameter, the assumed number of spills. If $p(n,i)$ is the probability of exactly n contacts to environmental resource i, then:

$$p(n,i) = \frac{\lambda_i^n \cdot e^{-\lambda i}}{n!}$$

where *n* is the specific number of spills (0, 1, 2, ..., *n*), *e* is the base of the natural logarithm, and λ is the parameter of the Poisson distribution. For oil spills, the Poisson parameter (λ) is equal to the spill rate multiplied by the volume of oil to be produced or transported. The spill rate has dimensions of number of spills/Bbbl, and the volume is expressed in Bbbl. Therefore, λ denotes the mean number of spills estimated to occur as a result of production or transportation of a specific volume of oil.

Oil-spill occurrence estimates for spills greater than or equal to 1,000 bbl were calculated for production and transportation of oil during the 30-year analysis period associated with the proposed actions in the Beaufort Sea OCS Program (2004-2033). These probabilities are based on the volume of oil assumed to be found, produced, and transported over the production life of the lease and on the rates that have been calculated for oil spills from OCS platforms and pipelines by the Bercha Group. The probabilities of one or more oil spills greater than or equal to 1,000 bbl occurring as a result of OCS production and transportation resulting from the proposed lease sales or deferral area alternatives are found in USDOI/MMS (2006: Table C-8). The updated probabilities of one or more large spills occurring for Lease Sale 202 are shown in Table R1.

Discussion

Tables R20 through R25 and R29 through R31 show the annual combined probabilities for the Proposal and the alternatives for Sale 202. The combined probabilities were recalculated using the updated spill rates for Sale 202. For the most part, the chance of one or more spills occurring and contacting environmental resource areas or land segments is less than (<) 0.5 percent within 30 days. The OSRA model estimates a <0.5- to 4-percent chance of one or more spills greater than or equal to (≥) 1,000 bbl occurring and contacting environmental resources areas, land segments, or land within 30 days, over the production life of the Proposed Action. The OSRA model estimates a <0.5- to 5-percent chance of one or more spills ≥1,000 bbl occurring and contacting environmental resource areas or land segments within 360 days, over the production life of the Proposed Action. The OSRA model estimates a 14-percent chance of one or more spills ≥1,000 bbl occurring and contacting land within 360 days, over the production life of the Proposed Action.

Because the combined probabilities are similar to one another, it is difficult to distinguish differences between the Proposal and alternatives based on combined probabilities.

References Cited

Bercha Group, 2002. Alternative Oil Spill Occurrence Estimators for the Beaufort and Chukchi Seas – Fault Tree Method. OCS Study MMS 2002-047. Prepared for USDOI/MMS, Alaska OCS Region. Contract No. 01-00-PO-17199. Calgary, Alberta, Canada: Bercha International Inc., Bercha Group. August 2002

Bercha Group. 2006. Alternative Oil Spill Occurrence Estimators and their Variability for the Beaufort Sea – Fault Tree Method . OCS Study MMS 2005-061. Prepared for USDOI/MMS, Alaska OCS Region. MMS Contract Number 1435-01-04-PO-336507. Calgary, Alberta, Canada: Bercha International Inc., Bercha Group. January 2006.

Devanney, M.W., III, and R.J. Stewart. 1974. Analysis of Oilspill Statistics, April 1974. Massachusetts Institute of Technology (Cambridge) Report No. MITSG-74-20. Prepared for the Council on Environmental Quality.

Johnson, W.R., C.M. Anderson, C.F. Marshall, and E.M. Lear. 2002. Oil-Spill Risk Analysis: Beaufort Sea Planning Area, Sales 186, 195, and 202. OCS Report MMS 2002-058. Herndon, VA: USDOI/Minerals Management Service, Environmental Division. September 2002.

U.S. Department of the Interior, Minerals Management Service (USDOI/MMS). 2006. Environmental Assessment, Proposed OCS Lease Sale 202, Beaufort Sea Planning Area. OCS EIS/EA MMS 2006-001. Anchorage, AK: USDOI/MMS, Alaska OCS Region.

Table 1R. Estimated Percent Chance of One or More Large Platform, Pipeline, and Total Spills for Lease Sale 202 and Its Alternatives over the Life of the Project

	Alternative	Percent Chance of One or More Pipeline Spills	Percent Chance of One or More Platform Spills	Percent Chance of One or More Spills Total
I	Full Sale Area	9	14	21
II	No Sale	0	0	0
III	Barrow Subsistence Whale Deferral	9	14	21
IV	Nuiqsut Subsistence Whale Deferral	9	13	21
V	Kaktovik Subsistence Whale Deferral	9	14	21
VI	Eastern Deferral	9	14	21
VII	Proposed Action	9	14	21

Table 20R. Combined probabilities (expressed as percent chance) of one or more spills greater than or equal to 1,000 barrels, and the estimated number of spills (mean), occurring and contacting a certain environmental resource over the assumed production life of the lease area within 3 days, Beaufort Sale 202.

Environmental Resource	Full Sale Area		Barrow Subsistence Deferral		Nuiqsut Subsistence Deferral		Kaktovik Subsistence Deferral		Eastern Bowhead Deferral		Proposed Action	
	Prob	Mean	Prob	Mean	Prob	Mean	Prob	Mean	Prob	Mean	Prob	Mean
Land	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
Kasegaluk Lagoon	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Point Barrow, Plover Islands	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Thetis and Jones Islands	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Cottle & Return Islands, West Dock	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Midway Islands	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Cross and No Name Islands	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Endicott Causeway	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
McClure Islands	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Stockton Islands	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Tigvariak Island	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Maguire Islands	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Flaxman Island	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Barrier Islands	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Anderson Point Barrier Islands	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Arey and Barter Islands, Bernard Spit	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Jago and Tapkaurak Spits	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Angun and Beaufort Lagoons	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Icy Reef	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Chukchi Spring Lead 1	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Chukchi Spring Lead 2	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Chukchi Spring Lead 3	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Chukchi Spring Lead 4	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Chukchi Spring Lead 5	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Beaufort Spring Lead 6	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Beaufort Spring Lead 7	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Beaufort Spring Lead 8	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Beaufort Spring Lead 9	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Beaufort Spring Lead 10	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Ice/Sea Segment 1	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Ice/Sea Segment 2	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Ice/Sea Segment 3	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Ice/Sea Segment 4	1	0.0	1	0.0	n	0.0	1	0.0	1	0.0	1	0.0
Ice/Sea Segment 5	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Ice/Sea Segment 6	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
Ice/Sea Segment 7	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Ice/Sea Segment 8	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Ice/Sea Segment 9	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Point Hope Subsistence Area	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Point Lay Subsistence Area	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Wainwright Subsistence Area	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Barrow Subsistence Area 1	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Barrow Subsistence Area 2	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Nuiqsut Subsistence Area	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Kaktovik Subsistence Area	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0

Note: ** = Greater than 99.5%; n = Less than 0.5%.

Table 20R (Continued). Combined probabilities (expressed as percent chance) of one or more spills greater than or equal to 1,000 barrels, and the estimated number of spills (mean), occurring and contacting a certain environmental resource over the assumed production life of the lease area within 3 days, Beaufort Sale 202.

Environmental Resource	Full Sale Area		Barrow Subsistence Deferral		Nuiqsut Subsistence Deferral		Kaktovik Subsistence Deferral		Eastern Bowhead Deferral		Proposed Action	
	Prob	Mean	Prob	Mean	Prob	Mean	Prob	Mean	Prob	Mean	Prob	Mean
Whale Concentration Area	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Herald Shoal Polynya	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Ice/Sea Segment 10	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Ice/Sea Segment 11	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Hanna's Shoal Polynya	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Ice/Sea Segment 12	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Ice/Sea Segment 13	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Ice/Sea Segment 14	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Ice/Sea Segment 15	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
Ice/Sea Segment 16a	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
Ice/Sea Segment 17	2	0.0	2	0.0	1	0.0	2	0.0	2	0.0	2	0.0
Ice/Sea Segment 18a	2	0.0	2	0.0	1	0.0	2	0.0	2	0.0	2	0.0
Ice/Sea Segment 19	4	0.0	4	0.0	4	0.0	4	0.0	4	0.0	4	0.0
Ice/Sea Segment 20a	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Ice/Sea Segment 21	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Ice/Sea Segment 22	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Ice/Sea Segment 22	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Ice/Sea Segment 24a	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Ledyard Bay	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Peard Bay	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
ERA 1	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
ERA 2	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Ice/Sea Segment 16b	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
Harrison Bay	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Harrison Bay/Colville Delta	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
ERA 3	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
Simpson Lagoon	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Gwyder Bay	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Prudhoe Bay	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Cross Island ERA	1	0.0	1	0.0	n	0.0	1	0.0	1	0.0	1	0.0
Water over Boulder Patch 1	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Water over Boulder Patch 2	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Foggy Island Bay	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Mikkelsen Bay	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
ERA 4	1	0.0	1	0.0	n	0.0	1	0.0	1	0.0	1	0.0
Ice/Sea Segment 18b	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
Simpson Cove	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
ERA 5	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Kaktovik ERA	1	0.0	1	0.0	1	0.0	n	0.0	1	0.0	n	0.0
Ice/Sea Segment 20b	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
ERA 6	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
ERA 7	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
ERA 8	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Ice Sea Segment 24b	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0

Note: ** = Greater than 99.5%; n = Less than 0.5%.

Table 21R. Combined probabilities (expressed as percent chance) of one or more spills greater than or equal to 1,000 barrels, and the estimated number of spills (mean), occurring and contacting a certain environmental resource over the assumed production life of the lease area within 10 days, Beaufort Sale 202.

Environmental Resource	Full Sale Area		Barrow Subsistence Deferral		Nuiqsut Subsistence Deferral		Kaktovik Subsistence Deferral		Eastern Bowhead Deferral		Proposed Action	
	Prob	Mean	Prob	Mean	Prob	Mean	Prob	Mean	Prob	Mean	Prob	Mean
Land	2	0.0	2	0.0	2	0.0	2	0.0	2	0.0	2	0.0
Kasegaluk Lagoon	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Point Barrow, Plover Islands	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Thetis and Jones Islands	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Cottle & Return Islands, West Dock	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Midway Islands	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Cross and No Name Islands	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Endicott Causeway	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
McClure Islands	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Stockton Islands	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Tigvariak Island	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Maguire Islands	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Flaxman Island	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Barrier Islands	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Anderson Point Barrier Islands	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Arey and Barter Islands, Bernard Spit	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Jago and Tapkaurak Spits	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Angun and Beaufort Lagoons	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Icy Reef	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Chukchi Spring Lead 1	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Chukchi Spring Lead 2	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Chukchi Spring Lead 3	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Chukchi Spring Lead 4	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Chukchi Spring Lead 5	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Beaufort Spring Lead 6	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Beaufort Spring Lead 7	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Beaufort Spring Lead 8	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Beaufort Spring Lead 9	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Beaufort Spring Lead 10	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Ice/Sea Segment 1	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Ice/Sea Segment 2	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Ice/Sea Segment 3	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
Ice/Sea Segment 4	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
Ice/Sea Segment 5	1	0.0	1	0.0	n	0.0	1	0.0	1	0.0	1	0.0
Ice/Sea Segment 6	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
Ice/Sea Segment 7	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Ice/Sea Segment 8	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Ice/Sea Segment 9	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Point Hope Subsistence Area	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Point Lay Subsistence Area	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Wainwright Subsistence Area	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Barrow Subsistence Area 1	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Barrow Subsistence Area 2	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Nuiqsut Subsistence Area	1	0.0	1	0.0	n	0.0	1	0.0	1	0.0	1	0.0
Kaktovik Subsistence Area	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0

Note: ** = Greater than 99.5%; n = Less than 0.5%.

Table 21R (Continued). Combined probabilities (expressed as percent chance) of one or more spills greater than or equal to 1,000 barrels, and the estimated number of spills (mean), occurring and contacting a certain environmental resource over the assumed production life of the lease area within 10 days, Beaufort Sale 202.

Environmental Resource	Full Sale Area		Barrow Subsistence Deferral		Nuiqsut Subsistence Deferral		Kaktovik Subsistence Deferral		Eastern Bowhead Deferral		Proposed Action	
	Prob	Mean	Prob	Mean	Prob	Mean	Prob	Mean	Prob	Mean	Prob	Mean
Whale Concentration Area	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Herald Shoal Polynya	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Ice/Sea Segment 10	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Ice/Sea Segment 11	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Hanna's Shoal Polynya	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Ice/Sea Segment 12	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Ice/Sea Segment 13	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Ice/Sea Segment 14	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Ice/Sea Segment 15	2	0.0	2	0.0	2	0.0	2	0.0	2	0.0	2	0.0
Ice/Sea Segment 16a	2	0.0	2	0.0	2	0.0	2	0.0	2	0.0	2	0.0
Ice/Sea Segment 17	3	0.0	3	0.0	2	0.0	3	0.0	3	0.0	3	0.0
Ice/Sea Segment 18a	3	0.0	3	0.0	2	0.0	3	0.0	3	0.0	3	0.0
Ice/Sea Segment 19	4	0.0	4	0.0	4	0.0	4	0.0	4	0.0	4	0.0
Ice/Sea Segment 20a	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
Ice/Sea Segment 21	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Ice/Sea Segment 22	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Ice/Sea Segment 22	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Ice/Sea Segment 24a	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Ledyard Bay	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Peard Bay	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
ERA 1	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
ERA 2	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
Ice/Sea Segment 16b	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
Harrison Bay	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Harrison Bay/Colville Delta	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
ERA 3	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
Simpson Lagoon	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Gwyder Bay	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Prudhoe Bay	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Cross Island ERA	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
Water over Boulder Patch 1	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Water over Boulder Patch 2	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Foggy Island Bay	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Mikkelsen Bay	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
ERA 4	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
Ice/Sea Segment 18b	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
Simpson Cove	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
ERA 5	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
Kaktovik ERA	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
Ice/Sea Segment 20b	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
ERA 6	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
ERA 7	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
ERA 8	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Ice Sea Segment 24b	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0

Note: ** = Greater than 99.5%; n = Less than 0.5%.

Table 22R. Combined probabilities (expressed as percent chance) of one or more spills greater than or equal to 1,000 barrels, and the estimated number of spills (mean), occurring and contacting a certain environmental resource over the assumed production life of the lease area within 30 days, Beaufort Sale 202.

Environmental Resource	Full Sale Area		Barrow Subsistence Deferral		Nuiqsut Subsistence Deferral		Kaktovik Subsistence Deferral		Eastern Bowhead Deferral		Proposed Action	
	Prob	Mean	Prob	Mean	Prob	Mean	Prob	Mean	Prob	Mean	Prob	Mean
Land	4	0.0	4	0.0	4	0.0	4	0.0	4	0.0	4	0.0
Kasegaluk Lagoon	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Point Barrow, Plover Islands	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Thetis and Jones Islands	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
Cottle & Return Islands, West Dock	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Midway Islands	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Cross and No Name Islands	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Endicott Causeway	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
McClure Islands	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Stockton Islands	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Tigvariak Island	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Maguire Islands	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Flaxman Island	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Barrier Islands	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Anderson Point Barrier Islands	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Arey and Barter Islands, Bernard Spit	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Jago and Tapkaurak Spits	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Angun and Beaufort Lagoons	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Icy Reef	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Chukchi Spring Lead 1	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Chukchi Spring Lead 2	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Chukchi Spring Lead 3	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Chukchi Spring Lead 4	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Chukchi Spring Lead 5	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Beaufort Spring Lead 6	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Beaufort Spring Lead 7	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Beaufort Spring Lead 8	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Beaufort Spring Lead 9	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
Beaufort Spring Lead 10	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
Ice/Sea Segment 1	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Ice/Sea Segment 2	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
Ice/Sea Segment 3	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
Ice/Sea Segment 4	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
Ice/Sea Segment 5	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
Ice/Sea Segment 6	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
Ice/Sea Segment 7	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
Ice/Sea Segment 8	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Ice/Sea Segment 9	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Point Hope Subsistence Area	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Point Lay Subsistence Area	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Wainwright Subsistence Area	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Barrow Subsistence Area 1	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Barrow Subsistence Area 2	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
Nuiqsut Subsistence Area	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
Kaktovik Subsistence Area	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0

Note: ** = Greater than 99.5%; n = Less than 0.5%.

Table 22R (Continued). Combined probabilities (expressed as percent chance) of one or more spills greater than or equal to 1,000 barrels, and the estimated number of spills (mean), occurring and contacting a certain environmental resource over the assumed production life of the lease area within 30 days, Beaufort Sale 202.

Environmental Resource	Full Sale Area Prob	Mean	Barrow Subsistence Deferral Prob	Mean	Nuiqsut Subsistence Deferral Prob	Mean	Kaktovik Subsistence Deferral Prob	Mean	Eastern Bowhead Deferral Prob	Mean	Proposed Action Prob	Mean
Whale Concentration Area	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Herald Shoal Polynya	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Ice/Sea Segment 10	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Ice/Sea Segment 11	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Hanna's Shoal Polynya	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Ice/Sea Segment 12	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Ice/Sea Segment 13	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Ice/Sea Segment 14	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Ice/Sea Segment 15	3	0.0	2	0.0	2	0.0	3	0.0	3	0.0	2	0.0
Ice/Sea Segment 16a	3	0.0	3	0.0	3	0.0	3	0.0	3	0.0	3	0.0
Ice/Sea Segment 17	4	0.0	4	0.0	3	0.0	4	0.0	4	0.0	4	0.0
Ice/Sea Segment 18a	3	0.0	3	0.0	2	0.0	3	0.0	3	0.0	3	0.0
Ice/Sea Segment 19	5	0.0	5	0.0	5	0.0	4	0.0	4	0.0	4	0.0
Ice/Sea Segment 20a	2	0.0	2	0.0	2	0.0	2	0.0	2	0.0	2	0.0
Ice/Sea Segment 21	1	0.0	1	0.0	1	0.0	n	0.0	n	0.0	n	0.0
Ice/Sea Segment 22	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Ice/Sea Segment 22	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Ice/Sea Segment 24a	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Ledyard Bay	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Peard Bay	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
ERA 1	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
ERA 2	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
Ice/Sea Segment 16b	2	0.0	2	0.0	2	0.0	2	0.0	2	0.0	2	0.0
Harrison Bay	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
Harrison Bay/Colville Delta	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
ERA 3	2	0.0	2	0.0	2	0.0	2	0.0	2	0.0	2	0.0
Simpson Lagoon	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
Gwyder Bay	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Prudhoe Bay	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Cross Island ERA	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
Water over Boulder Patch 1	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Water over Boulder Patch 2	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Foggy Island Bay	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Mikkelsen Bay	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
ERA 4	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
Ice/Sea Segment 18b	2	0.0	2	0.0	1	0.0	2	0.0	2	0.0	2	0.0
Simpson Cove	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
ERA 5	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
Kaktovik ERA	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
Ice/Sea Segment 20b	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
ERA 6	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
ERA 7	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
ERA 8	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Ice Sea Segment 24b	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0

Note: ** = Greater than 99.5%; n = Less than 0.5%.

Table 23R. Combined probabilities (expressed as percent chance) of one or more spills greater than or equal to 1,000 barrels, and the estimated number of spills (mean), occurring and contacting a certain environmental resource over the assumed production life of the lease area within 60 days, Beaufort Sale 202.

Environmental Resource	Full Sale Area		Barrow Subsistence Deferral		Nuiqsut Subsistence Deferral		Kaktovik Subsistence Deferral		Eastern Bowhead Deferral		Proposed Action	
	Prob	Mean	Prob	Mean	Prob	Mean	Prob	Mean	Prob	Mean	Prob	Mean
Land	6	0.1	6	0.1	6	0.1	6	0.1	6	0.1	6	0.1
Kasegaluk Lagoon	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Point Barrow, Plover Islands	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Thetis and Jones Islands	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
Cottle & Return Islands, West Dock	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Midway Islands	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Cross and No Name Islands	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Endicott Causeway	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
McClure Islands	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Stockton Islands	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Tigvariak Island	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Maguire Islands	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Flaxman Island	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Barrier Islands	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Anderson Point Barrier Islands	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Arey and Barter Islands, Bernard Spit	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Jago and Tapkaurak Spits	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Angun and Beaufort Lagoons	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Icy Reef	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Chukchi Spring Lead 1	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Chukchi Spring Lead 2	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Chukchi Spring Lead 3	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Chukchi Spring Lead 4	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Chukchi Spring Lead 5	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Beaufort Spring Lead 6	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Beaufort Spring Lead 7	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Beaufort Spring Lead 8	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
Beaufort Spring Lead 9	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
Beaufort Spring Lead 10	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
Ice/Sea Segment 1	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Ice/Sea Segment 2	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
Ice/Sea Segment 3	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
Ice/Sea Segment 4	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
Ice/Sea Segment 5	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
Ice/Sea Segment 6	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
Ice/Sea Segment 7	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
Ice/Sea Segment 8	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Ice/Sea Segment 9	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Point Hope Subsistence Area	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Point Lay Subsistence Area	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Wainwright Subsistence Area	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Barrow Subsistence Area 1	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Barrow Subsistence Area 2	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
Nuiqsut Subsistence Area	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
Kaktovik Subsistence Area	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0

Note: ** = Greater than 99.5%; n = Less than 0.5%.

13

Table 23R. (Continued) Combined probabilities (expressed as percent chance) of one or more spills greater than or equal to 1,000 barrels, and the estimated number of spills (mean), occurring and contacting a certain environmental resource over the assumed production life of the lease area within 60 days, Beaufort Sale 202.

Environmental Resource	Full Sale Area		Barrow Subsistence Deferral		Nuiqsut Subsistence Deferral		Kaktovik Subsistence Deferral		Eastern Bowhead Deferral		Proposed Action	
	Prob	Mean	Prob	Mean	Prob	Mean	Prob	Mean	Prob	Mean	Prob	Mean
Whale Concentration Area	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Herald Shoal Polynya	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Ice/Sea Segment 10	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Ice/Sea Segment 11	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Hanna's Shoal Polynya	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Ice/Sea Segment 12	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Ice/Sea Segment 13	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Ice/Sea Segment 14	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Ice/Sea Segment 15	3	0.0	3	0.0	3	0.0	3	0.0	3	0.0	3	0.0
Ice/Sea Segment 16a	4	0.0	4	0.0	4	0.0	4	0.0	4	0.0	4	0.0
Ice/Sea Segment 17	4	0.0	4	0.0	4	0.0	4	0.0	4	0.0	4	0.0
Ice/Sea Segment 18a	3	0.0	3	0.0	3	0.0	3	0.0	3	0.0	3	0.0
Ice/Sea Segment 19	5	0.0	5	0.0	5	0.0	5	0.0	5	0.0	5	0.0
Ice/Sea Segment 20a	2	0.0	2	0.0	2	0.0	2	0.0	2	0.0	2	0.0
Ice/Sea Segment 21	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
Ice/Sea Segment 22	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Ice/Sea Segment 22	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Ice/Sea Segment 24a	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Ledyard Bay	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Peard Bay	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
ERA 1	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
ERA 2	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
Ice/Sea Segment 16b	2	0.0	2	0.0	2	0.0	2	0.0	2	0.0	2	0.0
Harrison Bay	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
Harrison Bay/Colville Delta	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
ERA 3	2	0.0	2	0.0	2	0.0	2	0.0	2	0.0	2	0.0
Simpson Lagoon	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
Gwyder Bay	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Prudhoe Bay	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Cross Island ERA	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
Water over Boulder Patch 1	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Water over Boulder Patch 2	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Foggy Island Bay	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Mikkelsen Bay	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
ERA 4	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
Ice/Sea Segment 18b	2	0.0	2	0.0	1	0.0	2	0.0	2	0.0	2	0.0
Simpson Cove	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
ERA 5	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
Kaktovik ERA	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
Ice/Sea Segment 20b	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
ERA 6	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
ERA 7	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
ERA 8	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Ice Sea Segment 24b	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0

Note: ** = Greater than 99.5%; n = Less than 0.5%.

14

Table 24R. Combined probabilities (expressed as percent chance) of one or more spills greater than or equal to 1,000 barrels, and the estimated number of spills (mean), occurring and contacting a certain environmental resource over the assumed production life of the lease area within 180 days, Beaufort Sale 202.

Environmental Resource	Full Sale Area		Barrow Subsistence Deferral		Nuiqsut Subsistence Deferral		Kaktovik Subsistence Deferral		Eastern Bowhead Deferral		Proposed Action	
	Prob	Mean	Prob	Mean	Prob	Mean	Prob	Mean	Prob	Mean	Prob	Mean
Land	10	0.1	10	0.1	10	0.1	10	0.1	10	0.1	10	0.1
Kasegaluk Lagoon	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Point Barrow, Plover Islands	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
Thetis and Jones Islands	2	0.0	2	0.0	1	0.0	2	0.0	2	0.0	2	0.0
Cottle & Return Islands, West Dock	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
Midway Islands	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Cross and No Name Islands	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Endicott Causeway	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
McClure Islands	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Stockton Islands	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Tigvariak Island	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Maguire Islands	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Flaxman Island	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Barrier Islands	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Anderson Point Barrier Islands	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Arey and Barter Islands, Bernard Spit	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
Jago and Tapkaurak Spits	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
Angun and Beaufort Lagoons	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Icy Reef	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Chukchi Spring Lead 1	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Chukchi Spring Lead 2	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Chukchi Spring Lead 3	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Chukchi Spring Lead 4	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Chukchi Spring Lead 5	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Beaufort Spring Lead 6	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
Beaufort Spring Lead 7	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
Beaufort Spring Lead 8	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
Beaufort Spring Lead 9	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
Beaufort Spring Lead 10	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
Ice/Sea Segment 1	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Ice/Sea Segment 2	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
Ice/Sea Segment 3	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
Ice/Sea Segment 4	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
Ice/Sea Segment 5	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
Ice/Sea Segment 6	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
Ice/Sea Segment 7	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
Ice/Sea Segment 8	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Ice/Sea Segment 9	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Point Hope Subsistence Area	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Point Lay Subsistence Area	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Wainwright Subsistence Area	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Barrow Subsistence Area 1	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Barrow Subsistence Area 2	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
Nuiqsut Subsistence Area	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
Kaktovik Subsistence Area	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0

Note: ** = Greater than 99.5%; n = Less than 0.5%.

Table 24R (Continued). Combined probabilities (expressed as percent chance) of one or more spills greater than or equal to 1,000 barrels, and the estimated number of spills (mean), occurring and contacting a certain environmental resource over the assumed production life of the lease area within 180 days, Beaufort Sale 202.

Environmental Resource	Full Sale Area Prob	Full Sale Area Mean	Barrow Subsistence Deferral Prob	Barrow Subsistence Deferral Mean	Nuiqsut Subsistence Deferral Prob	Nuiqsut Subsistence Deferral Mean	Kaktovik Subsistence Deferral Prob	Kaktovik Subsistence Deferral Mean	Eastern Bowhead Deferral Prob	Eastern Bowhead Deferral Mean	Proposed Action Prob	Proposed Action Mean
Whale Concentration Area	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Herald Shoal Polynya	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Ice/Sea Segment 10	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Ice/Sea Segment 11	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Hanna's Shoal Polynya	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Ice/Sea Segment 12	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Ice/Sea Segment 13	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Ice/Sea Segment 14	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
Ice/Sea Segment 15	4	0.0	4	0.0	4	0.0	4	0.0	4	0.0	4	0.0
Ice/Sea Segment 16a	5	0.1	5	0.1	5	0.0	5	0.1	5	0.1	5	0.1
Ice/Sea Segment 17	5	0.0	5	0.0	4	0.0	5	0.0	5	0.0	5	0.0
Ice/Sea Segment 18a	4	0.0	4	0.0	3	0.0	4	0.0	4	0.0	4	0.0
Ice/Sea Segment 19	5	0.1	5	0.1	5	0.1	5	0.1	5	0.1	5	0.1
Ice/Sea Segment 20a	3	0.0	3	0.0	3	0.0	3	0.0	3	0.0	3	0.0
Ice/Sea Segment 21	2	0.0	2	0.0	1	0.0	1	0.0	1	0.0	1	0.0
Ice/Sea Segment 22	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
Ice/Sea Segment 22	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
Ice/Sea Segment 24a	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Ledyard Bay	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Peard Bay	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
ERA 1	2	0.0	2	0.0	2	0.0	2	0.0	2	0.0	2	0.0
ERA 2	2	0.0	2	0.0	2	0.0	2	0.0	2	0.0	2	0.0
Ice/Sea Segment 16b	3	0.0	3	0.0	3	0.0	3	0.0	3	0.0	3	0.0
Harrison Bay	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
Harrison Bay/Colville Delta	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
ERA 3	3	0.0	3	0.0	3	0.0	3	0.0	3	0.0	3	0.0
Simpson Lagoon	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
Gwyder Bay	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Prudhoe Bay	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Cross Island ERA	2	0.0	2	0.0	1	0.0	2	0.0	2	0.0	2	0.0
Water over Boulder Patch 1	1	0.0	1	0.0	n	0.0	1	0.0	1	0.0	1	0.0
Water over Boulder Patch 2	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
Foggy Island Bay	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Mikkelsen Bay	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
ERA 4	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
Ice/Sea Segment 18b	2	0.0	2	0.0	2	0.0	2	0.0	2	0.0	2	0.0
Simpson Cove	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
ERA 5	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
Kaktovik ERA	2	0.0	2	0.0	2	0.0	2	0.0	2	0.0	2	0.0
Ice/Sea Segment 20b	2	0.0	2	0.0	2	0.0	2	0.0	2	0.0	2	0.0
ERA 6	1	0.0	1	0.0	1	0.0	1	0.0	n	0.0	1	0.0
ERA 7	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
ERA 8	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Ice Sea Segment 24b	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0

Note: ** = Greater than 99.5%; n = Less than 0.5%.

Table 25R. Combined probabilities (expressed as percent chance) of one or more spills greater than or equal to 1,000 barrels, and the estimated number of spills (mean), occurring and contacting a certain environmental resource over the assumed production life of the lease area within 360 days, Beaufort Sale 202.

Environmental Resource	Full Sale Area		Barrow Subsistence Deferral		Nuiqsut Subsistence Deferral		Kaktovik Subsistence Deferral		Eastern Bowhead Deferral		Proposed Action	
	Prob	Mean	Prob	Mean	Prob	Mean	Prob	Mean	Prob	Mean	Prob	Mean
Land	14	0.2	14	0.2	14	0.1	14	0.1	14	0.1	14	0.1
Kasegaluk Lagoon	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Point Barrow, Plover Islands	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
Thetis and Jones Islands	2	0.0	2	0.0	2	0.0	2	0.0	2	0.0	2	0.0
Cottle & Return Islands, West Dock	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
Midway Islands	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Cross and No Name Islands	1	0.0	1	0.0	n	0.0	1	0.0	1	0.0	1	0.0
Endicott Causeway	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
McClure Islands	1	0.0	1	0.0	n	0.0	1	0.0	1	0.0	1	0.0
Stockton Islands	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Tigvariak Island	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Maguire Islands	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Flaxman Island	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Barrier Islands	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Anderson Point Barrier Islands	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Arey and Barter Islands, Bernard Spit	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
Jago and Tapkaurak Spits	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
Angun and Beaufort Lagoons	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Icy Reef	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Chukchi Spring Lead 1	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Chukchi Spring Lead 2	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Chukchi Spring Lead 3	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Chukchi Spring Lead 4	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Chukchi Spring Lead 5	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Beaufort Spring Lead 6	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
Beaufort Spring Lead 7	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
Beaufort Spring Lead 8	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
Beaufort Spring Lead 9	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
Beaufort Spring Lead 10	2	0.0	2	0.0	2	0.0	2	0.0	2	0.0	2	0.0
Ice/Sea Segment 1	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Ice/Sea Segment 2	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
Ice/Sea Segment 3	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
Ice/Sea Segment 4	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
Ice/Sea Segment 5	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
Ice/Sea Segment 6	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
Ice/Sea Segment 7	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
Ice/Sea Segment 8	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Ice/Sea Segment 9	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Point Hope Subsistence Area	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Point Lay Subsistence Area	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Wainwright Subsistence Area	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Barrow Subsistence Area 1	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Barrow Subsistence Area 2	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
Nuiqsut Subsistence Area	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
Kaktovik Subsistence Area	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0

Note: ** = Greater than 99.5%; n = Less than 0.5%.

Table 25R (Continued). Combined probabilities (expressed as percent chance) of one or more spills greater than or equal to 1,000 barrels, and the estimated number of spills (mean), occurring and contacting a certain environmental resource over the assumed production life of the lease area within 360 days, Beaufort Sale 202.

Environmental Resource	Full Sale Area		Barrow Subsistence Deferral		Nuiqsut Subsistence Deferral		Kaktovik Subsistence Deferral		Eastern Bowhead Deferral		Proposed Action	
	Prob	Mean	Prob	Mean	Prob	Mean	Prob	Mean	Prob	Mean	Prob	Mean
Whale Concentration Area	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Herald Shoal Polynya	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Ice/Sea Segment 10	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Ice/Sea Segment 11	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Hanna's Shoal Polynya	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
Ice/Sea Segment 12	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Ice/Sea Segment 13	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Ice/Sea Segment 14	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
Ice/Sea Segment 15	4	0.0	4	0.0	4	0.0	4	0.0	4	0.0	4	0.0
Ice/Sea Segment 16a	5	0.1	5	0.1	5	0.1	5	0.1	5	0.1	5	0.1
Ice/Sea Segment 17	5	0.1	5	0.1	5	0.0	5	0.1	5	0.1	5	0.1
Ice/Sea Segment 18a	4	0.0	4	0.0	3	0.0	4	0.0	4	0.0	4	0.0
Ice/Sea Segment 19	5	0.1	5	0.1	5	0.1	5	0.1	5	0.1	5	0.1
Ice/Sea Segment 20a	4	0.0	4	0.0	4	0.0	3	0.0	3	0.0	3	0.0
Ice/Sea Segment 21	2	0.0	2	0.0	2	0.0	2	0.0	2	0.0	2	0.0
Ice/Sea Segment 22	2	0.0	2	0.0	2	0.0	2	0.0	2	0.0	2	0.0
Ice/Sea Segment 22	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
Ice/Sea Segment 24a	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
Ledyard Bay	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Peard Bay	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
ERA 1	2	0.0	2	0.0	2	0.0	2	0.0	2	0.0	2	0.0
ERA 2	3	0.0	3	0.0	3	0.0	3	0.0	3	0.0	3	0.0
Ice/Sea Segment 16b	4	0.0	4	0.0	4	0.0	4	0.0	4	0.0	4	0.0
Harrison Bay	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
Harrison Bay/Colville Delta	2	0.0	2	0.0	2	0.0	2	0.0	2	0.0	2	0.0
ERA 3	4	0.0	4	0.0	3	0.0	4	0.0	4	0.0	4	0.0
Simpson Lagoon	2	0.0	2	0.0	2	0.0	2	0.0	2	0.0	2	0.0
Gwyder Bay	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Prudhoe Bay	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
Cross Island ERA	2	0.0	2	0.0	1	0.0	2	0.0	2	0.0	2	0.0
Water over Boulder Patch 1	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
Water over Boulder Patch 2	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
Foggy Island Bay	1	0.0	1	0.0	n	0.0	1	0.0	1	0.0	1	0.0
Mikkelsen Bay	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
ERA 4	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
Ice/Sea Segment 18b	2	0.0	2	0.0	2	0.0	2	0.0	2	0.0	2	0.0
Simpson Cove	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0	n	0.0
ERA 5	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
Kaktovik ERA	2	0.0	2	0.0	2	0.0	2	0.0	2	0.0	2	0.0
Ice/Sea Segment 20b	2	0.0	2	0.0	2	0.0	2	0.0	2	0.0	2	0.0
ERA 6	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
ERA 7	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
ERA 8	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
Ice Sea Segment 24b	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0

Note: ** = Greater than 99.5%; n = Less than 0.5%.

18

Table 29R. Combined probabilities (expressed as percent chance) of one or more spills greater than or equal to 1,000 barrels, and the expected number of spills (mean), occurring and contacting a certain land segment over the assumed production life of the lease area within 60 days, Beaufort Sale 202.

Land Segment	Full Sale Area		Barrow Subsistence Deferral		Nuiqsut Subsistence Deferral		Kaktovik Subsistence Deferral		Eastern Bowhead Deferral		Proposed Action	
	Prob	Mean	Prob	Mean	Prob	Mean	Prob	Mean	Prob	Mean	Prob	Mean
32	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0

Note: ** = Greater than 99.5%; n = less than 0.5%. Segments with less than 0.5 percent probability of one or more contacts within 60 days are not shown.

Table 30R. Combined probabilities (expressed as percent chance) of one or more spills greater than or equal to 1,000 barrels, and the expected number of spills (mean), occurring and contacting a certain land segment over the assumed production life of the lease area within 180 days, Beaufort Sale 202.

Land Segment	Full Sale Area		Barrow Subsistence Deferral		Nuiqsut Subsistence Deferral		Kaktovik Subsistence Deferral		Eastern Bowhead Deferral		Proposed Action	
	Prob	Mean	Prob	Mean	Prob	Mean	Prob	Mean	Prob	Mean	Prob	Mean
25	1	0.0	n	0.0	n	0.0	1	0.0	1	0.0	n	0.0
28	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
31	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
32	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
36	1	0.0	1	0.0	n	0.0	1	0.0	1	0.0	1	0.0
47	1	0.0	1	0.0	1	0.0	n	0.0	1	0.0	n	0.0

Note: ** = Greater than 99.5%; n = less than 0.5%. Segments with less than 0.5 percent probability of one or more contacts within 180 days are not shown.

Table 31R. Combined probabilities (expressed as percent chance) of one or more spills greater than or equal to 1,000 barrels, and the expected number of spills (mean), occurring and contacting a certain land segment over the assumed production life of the lease area within 360 days, Beaufort Sale 202.

Land Segment	Full Sale Area		Barrow Subsistence Deferral		Nuiqsut Subsistence Deferral		Kaktovik Subsistence Deferral		Eastern Bowhead Deferral		Proposed Action	
	Prob	Mean	Prob	Mean	Prob	Mean	Prob	Mean	Prob	Mean	Prob	Mean
25	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
28	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
30	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
31	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
32	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
35	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
36	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
37	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0
47	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0	1	0.0

Note: ** = Greater than 99.5%; n = less than 0.5%. Segments with less than 0.5 percent probability of one or more contacts within 360days are not shown.

The Department of the Interior Mission

As the Nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering sound use of our land and water resources; protecting our fish, wildlife, and biological diversity; preserving the environmental and cultural values of our national parks and historical places; and providing for the enjoyment of life through outdoor recreation. The Department assesses our energy and mineral resources and works to ensure that their development is in the best interests of all our people by encouraging stewardship and citizen participation in their care. The Department also has a major responsibility for American Indian reservation communities and for people who live in island territories under U.S. administration.

The Minerals Management Service Mission

As a bureau of the Department of the Interior, the Minerals Management Service's (MMS) primary responsibilities are to manage the mineral resources located on the Nation's Outer Continental Shelf (OCS), collect revenue from the Federal OCS and onshore Federal and Indian lands, and distribute those revenues.

Moreover, in working to meet its responsibilities, the **Offshore Minerals Management Program** administers the OCS competitive leasing program and oversees the safe and environmentally sound exploration and production of our Nation's offshore natural gas, oil and other mineral resources. The MMS **Minerals Revenue Management** meets its responsibilities by ensuring the efficient, timely and accurate collection and disbursement of revenue from mineral leasing and production due to Indian tribes and allottees, States and the U.S. Treasury.

The MMS strives to fulfill its responsibilities through the general guiding principles of: (1) being responsive to the public's concerns and interests by maintaining a dialogue with all potentially affected parties and (2) carrying out its programs with an emphasis on working to enhance the quality of life for all Americans by lending MMS assistance and expertise to economic development and environmental protection.